

**WHAT IS CLAIMED IS:**

1. A method for manufacturing molten iron, comprising the steps of:  
producing a mixture containing iron by drying and mixing iron containing  
ores and additives;  
5        passing the mixture containing iron through one or more successively-  
connected fluidized beds so that the mixture is reduced and calcined to thereby  
perform conversion into a reduced material;  
      forming a coal packed bed, which is a heat source in which the reduced  
material has been melted;  
10        charging the reduced material to the coal packed bed and supplying  
oxygen to the coal packed bed to manufacture iron; and  
      supplying reduced gas exhausted from the coal packed bed to the fluidized  
bed,  
      wherein in the step of converting the mixture to a reduced material, oxygen  
15        is directly supplied and combusted in an area where reduced gas flows to the  
fluidized bed.  
      2. The method of claim 1, wherein in the step of converting the mixture  
containing iron to a reduced material, water is supplied separately from oxygen  
supply combustion process and is mixed with the oxygen.  
20        3. The method of claim 2, wherein the water is one of process water and  
steam.  
      4. The method of claim 2, wherein the water is supplied at a rate of  
300~500Nm<sup>3</sup>/hr.  
      5. The method of claim 1, wherein the oxygen is supplied and combusted in  
25        the case where an internal temperature of a fluidized-bed is 650°C or higher.  
      6. The method of claim 1, wherein the step of converting the mixture  
containing iron to a reduced material comprises the steps of:  
      (a) pre-heating the mixture containing iron in a first fluidized bed;  
      (b) performing preliminary reduction of the pre-heated mixture containing  
30        iron in a second fluidized bed; and  
      (c) performing final reduction of the mixture containing iron that has  
undergone preliminary reduction to thereby realize conversion into the reduced  
material,

wherein the oxygen is directly supplied and combusted in the steps of (a) and (b).

7. The method of claim 6, wherein oxygen is supplied and combusted immediately prior to steps (a), (b), and (c).

5           8. The method of claim 7, wherein water is supplied separately from the supply and combustion of the oxygen.

          9. An apparatus for manufacturing molten iron, comprising:  
          one or more fluidized-bed reactors that reduce and calcine iron ores and additives which are dried and mixed, to convert into a reduced material;  
10           a melter-gasifier for charging the reduced material and receiving the supply of oxygen to manufacture iron; and  
          a reduced gas supply line for supplying reducing gas exhausted from the melter-gasifier to the fluidized-bed reactors,

          wherein the fluidized-bed reactors each include a dispersing plate at a lower area thereof and through which the reduced gas passes, and an oxygen burner mounted to an outer wall of the fluidized-bed reactor at an area above the dispersing plate.

15           10. The apparatus of claim 9, wherein the oxygen burner comprises:  
          a first member inside of which coolant circulates in a lengthwise direction;  
20           and  
          a second member encompassed by the first member along a lengthwise direction in a state separated from the same, and inside of which coolant is circulated,

          wherein oxygen is supplied and combusted between the first member and the second member, and a distance between the first member and the second member is getting reduced as coming close to the inside of the fluidized-bed reactor.

25           11. The apparatus of claim 9, wherein the fluidized-bed reactors each include a water supply nozzle mounted to an outer wall of the fluidized-bed reactor at an area above the dispersing plate, and positioned at an area in the vicinity of the  
30           oxygen burner.

          12. The apparatus of claim 11, wherein a direction that the water supply nozzle supplies water is at an angle of 4~15° with respect to the lengthwise direction of the oxygen burner.

13. The apparatus of claim 12, wherein the water is one of process water and steam.

14. The apparatus of claim 12, wherein the water is atomized and supplied at a rate of 300~500Nm<sup>3</sup>/hr.

5 15. The apparatus of claim 9, wherein each of the fluidized-bed reactors comprises:

a pre-heating furnace for pre-heating the mixture containing iron;

a preliminary reduction furnace connected to the pre-heating furnace and performing preliminary reduction of the pre-heated mixture containing iron; and

10 a final reduction furnace connected to the preliminary reduction furnace and performing final reduction of the mixture containing iron that has undergone preliminary reduction to thereby realize conversion into the reduced material,

wherein an oxygen burner is included in each of the pre-heating furnace and the preliminary reduction furnace.

15 16. The apparatus of claim 15, wherein each of the fluidized-bed reactors further comprises a water supply nozzle mounted to an outer wall of the fluidized-bed reactor at an area above the dispersing plate, and is positioned in the vicinity of the oxygen burner.